Amendments to the Claims

1. (Canceled)

2. (Currently Amended) A non-naturally occurring composition comprising unaggregated nucleic acid complexes, each complex consisting essentially of a single nucleic acid molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules ~~having~~ have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, wherein said complexes are rod-shaped when visualized by transmission electron microscopy ~~complex is compacted to a diameter which is less than (a) double the theoretical diameter of a complex of said single nucleic acid molecule and a sufficient number of polycation molecules to provide a charge ratio of about 1:1, in the form of a condensed sphere, or (b) 30 nm, whichever is larger~~.

3. (Original) The composition of claim 2 wherein the polycation molecules are polylysine or a polylysine derivative.

4. (Original) The composition of claim 3 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

5. (Currently Amended) The composition of claim 2, wherein said ~~complex is compacted to a diameter of less than 90 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

6. (Currently Amended) The composition of claim 2, wherein the ~~nucleic acid complex is compacted to a diameter less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

6 1

7. (Currently Amended) The composition of claim 2, wherein the ~~nucleic acid complex is compacted to a diameter less than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

7 1

8. (Currently Amended) The composition of claim 2, wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of 100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

9-19. (Canceled)

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20. (Currently Amended) A non-naturally occurring composition comprising unaggregated nucleic acid complexes, each complex consisting essentially of a single nucleic acid molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, said polycation ~~molecule~~ molecules having a nucleic acid binding moiety through which ~~it is~~ they are complexed to the nucleic acid, wherein said nucleic acid molecule encodes at least one functional protein, wherein said complexes are rod-shaped when visualized by transmission electron microscopy ~~complex is compacted to a diameter which is less than double the theoretical minimum diameter of a complex of said single nucleic acid molecule and a sufficient number of polycation molecules to provide a charge ratio of about 1:1, in the form of a condensed sphere, or 30 nm, whichever is larger~~.

21. (Original) The composition of claim 20 wherein the polycation molecules are polylysine or a polylysine derivative.

22. (Original) The composition of claim 21 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

23. (Original) The non-naturally occurring composition of claim 20 wherein said nucleic acid molecule comprises a promoter which controls transcription of an RNA molecule encoding the functional protein.

24. (Original) The non-naturally occurring composition of claim 20 wherein the protein is therapeutic.

25. (Currently Amended) The non-naturally occurring composition of claim 20 wherein the ~~complex is compacted to a diameter which is less than 50 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

26. (Currently Amended) The non-naturally occurring composition of claim 20 wherein the ~~complex is compacted to a diameter which is less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

27. (Currently Amended) The non-naturally occurring composition of claim 20 wherein the ~~nucleic acid complex is compacted to a diameter less than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

28. (Currently Amended) The non-naturally occurring composition of claim 20 wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of 100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

29. (Currently Amended) A non-naturally occurring composition comprising unaggregated nucleic acid complexes, each complex consisting essentially of a single double-stranded cDNA molecule and one or more polycation molecules, wherein said

complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules ~~having~~ have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, wherein said cDNA molecule encodes at least one functional protein, wherein said complexes are rod-shaped when visualized by transmission electron microscopy ~~complex is compacted to a diameter which is less than double the theoretical minimum diameter of a complex of said single cDNA molecule and a sufficient number of polycation molecules to provide a charge ratio of about 1:1, in the form of a condensed sphere, or 30 nm, whichever is larger~~.

30. (Original) The composition of claim 29 wherein the polycation molecules are polylysine or a polylysine derivative.

31. (Original) The composition of claim 30 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

32. (Currently Amended) A non-naturally occurring composition comprising unaggregated nucleic acid complexes, each complex consisting essentially of a single nucleic acid molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation molecules ~~having~~ have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, wherein said nucleic acid molecule encodes at least one antisense nucleic acid, wherein said complexes are rod-shaped when visualized by transmission electron microscopy ~~complex is compacted to a diameter which is less than double the theoretical minimum diameter of a complex of said single nucleic acid molecule and a sufficient number of polycation molecules to provide a charge ratio of about 1:1, in the form of a condensed sphere, or 30 nm, whichever is larger~~.

33. (Original) The composition of claim 32 wherein the polycation molecules are polylysine or a polylysine derivative.

34. (Original) The composition of claim 33 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

35. (Currently Amended) A non-naturally occurring composition comprising unaggregated nucleic acid complexes, each complex consisting essentially of a single nucleic acid molecule and one or more polycation molecules, wherein said complexes are formed by mixing said nucleic acid molecule and said polycation molecules, wherein prior to mixing said polycation ~~molecule having~~ molecules have a counterion selected from the group consisting of acetate, bicarbonate, and chloride, wherein said nucleic acid molecule is an RNA molecule, wherein said complexes are rod-shaped when visualized by transmission electron microscopy ~~complex is compacted to a diameter which is less than double the theoretical minimum diameter of a complex of said single nucleic acid molecule and a sufficient number of polycation molecules to provide a charge ratio of about 1:1, in the form of a condensed sphere, or 30 nm, whichever is larger~~.

36. (Original) The composition of claim 35 wherein the polycation molecules are polylysine or a polylysine derivative.

37. (Original) The composition of claim 36 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

38-46. (Canceled)

47. (Original) Non-naturally occurring, soluble compacted complexes of a nucleic acid and a polycation molecule, wherein said complexes are rod-shaped when visualized by transmission electron microscopy, wherein each complex consists essentially of a single

nucleic acid molecule and one or more polycation molecules, whereby said complexes are made by the process of:

mixing a nucleic acid with a polycation having acetate as a counterion, at a salt concentration sufficient for compaction of the complexes ~~claim 10~~.

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~~48~~. (Currently Amended) Non-naturally occurring, soluble compacted complexes of a nucleic acid and a polycation molecule, wherein the complexes are rod-shaped when visualized by transmission electron microscopy, wherein each complex consists essentially of a single nucleic acid molecule and one or more polycation molecules, whereby the complexes are made by the process of:

mixing a nucleic acid molecule with polycation molecules having a counterion selected from the group consisting of bicarbonate and chloride at a salt concentration sufficient for compaction of the complex, whereby unaggregated nucleic acid complexes are formed ~~claim 38~~.

28
~~49~~. (Currently Amended) Non-naturally occurring, soluble compacted complexes of a nucleic acid and a polycation molecule, wherein the complexes are rod-shaped when visualized by transmission electron microscopy, wherein each complex consists essentially of a single nucleic acid molecule and one or more polycation molecules, whereby the complexes are made by the process of:

mixing a nucleic acid molecule with polycation molecules having acetate as a counterion in a solvent to form a complex, said mixing being performed in the absence of added salt, whereby the nucleic acid forms soluble complexes with the polycation molecules without forming aggregates ~~claim 41~~.

29
~~50~~. (Currently Amended) Non-naturally occurring, soluble compacted complexes of a nucleic acid and a polycation wherein the complexes are rod-shaped when visualized by

transmission electron microscopy, wherein each complex consists essentially of a single nucleic acid molecule and one or more polycation molecules, whereby the complexes are made by the process of:

mixing a nucleic acid molecule with polycation molecules having a counterion selected from the group consisting of bicarbonate and chloride in a solvent to form a complex, said mixing being performed in the absence of added salt, whereby the nucleic acid forms soluble complexes with the polycation molecules without forming aggregates, ~~claim 44~~.

51. (Original) The complexes of claim 47 wherein the polycation molecules are polylysine or a polylysine derivative.

52. (Original) The complexes of claim 51 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

53. (Original) The complexes of claim 48 wherein the polycation molecules are polylysine or a polylysine derivative.

54. (Original) The complexes of claim 53 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

55. (Original) The complexes of claim 49 wherein the polycation molecules are polylysine or a polylysine derivative.

56. (Original) The complexes of claim 55 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

57. (Original) The complexes of claim 50 wherein the polycation molecules are polylysine or a polylysine derivative.

58. (Original) The complexes of claim 57 wherein the polylysine derivative is polylysine peptide with a cysteine residue.

59-69. (Canceled)

70. (Original) The composition of claim 29 wherein the nucleic acid complexes are associated with a lipid.

71. (Currently Amended) The composition of claim 29 wherein said ~~complex is compacted to a diameter of less than 90 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

72. (Currently Amended) The composition of claim 29 wherein the ~~nucleic acid complex is compacted to a diameter less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

73. (Currently Amended) The composition of claim 29 wherein the ~~nucleic acid complex is compacted to a diameter less than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

74. (Currently Amended) The composition of claim 29 wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of 100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

75. (Canceled)

76. (Currently Amended) The composition of claim 32 wherein said ~~complex is compacted to a diameter of less than 90 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

77. (Currently Amended) The composition of claim 32 wherein the ~~nucleic acid complex is compacted to a diameter less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

78. (Currently Amended) The composition of claim 32 wherein the ~~nucleic acid complex is compacted to a diameter not more than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

79. (Currently Amended) The composition of claim 32 wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of 100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

80. (Canceled)

81. (Currently Amended) The composition of claim 35 said ~~complex is compacted to a diameter of less than 90 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

82. (Currently Amended) The composition of claim 35 wherein the ~~nucleic acid complex is compacted to a diameter less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

83. (Currently Amended) The composition of claim 35 wherein the ~~nucleic acid complex is compacted to a diameter less than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

84. (Currently Amended) The composition of claim 35 wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of

100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

85-104. (Canceled)

105. (Currently Amended) The composition of claim 2 wherein said polycation ~~is~~ molecules are CK15-60P10 and the counterion is acetate, wherein CK15-60P10 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

106. (Currently Amended) The composition of claim 105 wherein the polycation ~~molecule comprises~~ molecules comprise 30 residues of lysine.

107. (Currently Amended) The composition of claim 105 wherein the polycation ~~molecule comprises~~ molecules comprise a targeting moiety.

108. (Currently Amended) The composition of claim 105, said ~~complex is compacted to a diameter of less than 90 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

109. (Currently Amended) The composition of claim 105, wherein the ~~nucleic acid complex is compacted to a diameter less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

110. (Currently Amended) The composition of claim 105, wherein the ~~nucleic acid complex is compacted to a diameter less than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

111. (Currently Amended) The composition of claim 105, wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of 100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

112. (Canceled)

113. (Original) The composition of claim 105 which is lyophilized.

114. (Original) The composition of claim 105 which is rehydrated after lyophilization.

115. (Original) The composition of claim 105 which does not contain a disaccharide.

116. (Original) A method of delivering polynucleotides to cells comprising:

contacting the composition of claim 114 with cells, whereby the nucleic acid is delivered to and taken up by the cells.

117. (Original) The method of claim 116 wherein the composition does not contain a disaccharide.

118. (Currently Amended) The composition of claim 20 wherein the polycation ~~is~~ molecules are CK15-60P10, and the counterion is acetate, wherein CK15-60 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

119. (Currently Amended) The composition of claim 118 wherein the polycation ~~molecule comprises~~ molecules comprise 30 residues of lysine.

120. (Currently Amended) The composition of claim 118 wherein the polycation ~~molecule comprises~~ molecules comprise a targeting moiety.

121. (Original) The composition of claim 118 which is lyophilized.

122. (Original) The non-naturally occurring composition of claim 118 wherein said nucleic acid molecule comprises a promoter which controls transcription of an RNA molecule encoding the functional protein.

123. (Original) The non-naturally occurring composition of claim 118 wherein the protein is therapeutic.

69 63
124. (Currently Amended) The non-naturally occurring composition of claim 118 wherein the ~~complex is compacted to a diameter which is less than 50 nm~~ rod-shaped complexes have a length of 100-300 nm when visualized by transmission electron microscopy.

70 63
125. (Currently Amended) The non-naturally occurring composition of claim 118 wherein the ~~complex is compacted to a diameter which is less than 30 nm~~ rod-shaped complexes have a length of 100-200 nm when visualized by transmission electron microscopy.

71 63
126. (Currently Amended) The non-naturally occurring composition of claim 118 wherein the ~~nucleic acid complex is compacted to a diameter less than 23 nm~~ rod-shaped complexes have a diameter of 10-20 nm when visualized by transmission electron microscopy.

72 63
127. (Currently Amended) The non-naturally occurring composition of claim 118 wherein the ~~nucleic acid complex is compacted to a diameter not more than 12 nm~~ rod-shaped complexes have a length of 100-300 nm and a diameter of 10-20 nm when visualized by transmission electron microscopy.

128. (Canceled)

129. (Original) The composition of claim 118 which is rehydrated after lyophilization.

130. (Original) The composition of claim 118 which does not contain a disaccharide.

131. (Original) A method of delivering polynucleotides to cells comprising:

contacting the composition of claim 129 with cells, wherein the polynucleotide encodes a protein, whereby the protein is expressed.

132. (Currently Amended) The composition of claim 29 wherein said polycation ~~is~~ molecules are CK15-60P10, and said counterion is acetate, wherein CK15-60P10 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

133. (Currently Amended) The composition of claim 132 wherein the polycation ~~molecule comprises~~ molecules comprise 30 residues of lysine.

134. (Currently Amended) The composition of claim 132 wherein the polycation ~~molecule comprises~~ molecules comprise a targeting moiety.

135. (Original) The composition of claim 132 which is lyophilized.

136. (Canceled)

137. (Original) The composition of claim 132 which is rehydrated after lyophilization.

138. (Original) The composition of claim 132 which does not contain a disaccharide.

139. (Original) A method of delivering polynucleotides to cells comprising:

contacting the composition of claim 137 with cells, wherein the polynucleotide encodes a protein, whereby the protein is expressed.

140. (Currently Amended) The composition of claim 32 wherein said polycation ~~is~~ molecules are CK15-60P10, and the counterion is acetate, wherein CK15-60P10 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a

molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

84 83
141. (Currently Amended) The composition of claim 140 wherein the polycation ~~molecule comprises~~ molecules comprise 30 residues of lysine.

85 83
142. (Currently Amended) The composition of claim 140 wherein the polycation ~~molecule comprises~~ molecules comprise a targeting moiety.

143. (Original) The composition of claim 140 which is lyophilized.

144. (Canceled)

145. (Original) The composition of claim 140 which is rehydrated after lyophilization.

146. (Original) The composition of claim 140 which does not contain a disaccharide.

147. (Original) A method of delivering polynucleotides to cells comprising:

contacting the compositions of claim 145 with cells, wherein the polynucleotide encodes an antisense nucleic acid, whereby the antisense nucleic acid is expressed.

90 23
148. (Currently Amended) The composition of claim 35 wherein said polycation ~~is~~ molecules are CK15-60P10, and said counterion is acetate, wherein CK15-60P10 is a polyamino acid polymer of one N-terminal cysteine and 15-60 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 10 kdal is attached to the cysteine residue.

91 10
149. (Currently Amended) The composition of claim 148 wherein the polycation ~~molecule comprises~~ molecules comprise 30 residues of lysine.

92 90
150. (Currently Amended) The composition of claim 148 wherein the polycation ~~molecule comprises~~ molecules comprise a targeting moiety.

151. (Original) The composition of claim 148 which is lyophilized.

152. (Original) The composition of claim 148 which is lyophilized and rehydrated.

153. (Original) The composition of claim 148 which does not contain a disaccharide.

154. (Original) A method of delivering polynucleotides to cells comprising:

contacting the composition of claim 152 with cells, whereby the polynucleotide is delivered to and taken up by the cells.

155-164. (Canceled)

165-176. (Withdrawn)

177. (Currently Amended) The composition of claim 2 wherein said polycation ~~is~~ molecules are CK30P5 or CK45P5 and the counterion is acetate, wherein CK30P5 or CK45P5 is a polyamino acid polymer of one N-terminal cysteine and 30 or 45 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 5 kdal is attached to the cysteine residue.

178. (Currently Amended) The composition of claim 20 wherein said polycation ~~is~~ molecules are CK30P5 or CK45P5 and the counterion is acetate, wherein CK30P5 or CK45P5 is a polyamino acid polymer of one N-terminal cysteine and 30 or 45 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 5 kdal is attached to the cysteine residue.

179. (Currently Amended) The composition of claim 29 wherein said polycation ~~is~~ molecules are CK30P5 or CK45P5 and the counterion is acetate, wherein CK30P5 or CK45P5 is a polyamino acid polymer of one N-terminal cysteine and 30 or 45 lysine

residues, wherein a molecule of polyethylene glycol having an average molecular weight of 5 kdal is attached to the cysteine residue.

180. (Currently Amended) The composition of claim 32 wherein said polycation ~~is~~ molecules are CK30P5 or CK45P5 and the counterion is acetate, wherein CK30P5 or CK45P5 is a polyamino acid polymer of one N-terminal cysteine and 30 or 45 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 5 kdal is attached to the cysteine residue.

181. (Currently Amended) The composition of claim 35 wherein said polycation ~~is~~ molecules are CK30P5 or CK45P5 and the counterion is acetate, wherein CK30P5 or CK45P5 is a polyamino acid polymer of one N-terminal cysteine and 30 or 45 lysine residues, wherein a molecule of polyethylene glycol having an average molecular weight of 5 kdal is attached to the cysteine residue.

182-186. (Canceled)

187. (New) The composition of claim 2 wherein the nucleic acid complexes are associated with a lipid.

188. (New) The composition of claim 20 wherein the nucleic acid complexes are associated with a lipid.

189. (New) The composition of claim 32 wherein the nucleic acid complexes are associated with a lipid.

190. (New) The composition of claim 35 wherein the nucleic acid complexes are associated with a lipid.

191. (New) The complexes of claim 47 wherein the complexes have a length of 100-300 nm.

107 26
192. (New) The complexes of claim 47 wherein the complexes have a length of 100-200 nm.

108 26
193. (New) The complexes of claim 47 wherein the complexes have a diameter of 10-20 nm.

109 26
194. (New) The complexes of claim 47 wherein the complexes have a length of 100-300 nm and a diameter of 10-20 nm.

110 27
195. (New) The complexes of claim 48 wherein the complexes have a length of 100-300 nm.

111 27
196. (New) The complexes of claim 48 wherein the complexes have a length of 100-200 nm.

112 27
197. (New) The complexes of claim 48 wherein the complexes have a diameter of 10-20 nm.

113 27
198. (New) The complexes of claim 48 wherein the complexes have a length of 100-300 nm and a diameter of 10-20 nm.

114 28
199. (New) The complexes of claim 49 wherein the complexes have a length of 100-300 nm.

115 28
200. (New) The complexes of claim 49 wherein the complexes have a length of 100-200 nm.

116 28
201. (New) The complexes of claim 49 wherein the complexes have a diameter of 10-20 nm.

117 28
202. (New) The complexes of claim 49 wherein the complexes have a length of 100-300 nm and a diameter of 10-20 nm.

118 29
203. (New) The complexes of claim 50 wherein the complexes have a length of 100-300 nm.

119 29
204. (New) The complexes of claim 50 wherein the complexes have a length of 100-200 nm.

120 29
205. (New) The complexes of claim 50 wherein the complexes have a diameter of 10-20 nm.

121 29
206. (New) The complexes of claim 50 wherein the complexes have a length of 100-300 nm and a diameter of 10-20 nm.

B' Cont'd

122 75
207. (New) The method of claim 131 wherein the composition does not contain a disaccharide.

123
208. (New) A method of delivering polynucleotide to cells comprising:

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contacting the composition of claim 139 with cells, whereby the polynucleotide is delivered to and taken up by the cells.